Annual Monitoring Report
for Implementing the
Kaibab National Forest Land Management Plan

1999

Forest Supervisor Certification

I certify that the Kaibab National Forest Plan as amended is sufficient to guide management of the Forest over the next year. Needs for change as identified in this document are necessary over time to maintain the viability of the Plan.

_____ ___/___/___.

CONNY J. FRISCH Date
Forest Supervisor

Monitoring Activities

The Monitoring Plan for the Kaibab National Forest Plan identifies 58 items to be tracked a measures of the effectiveness of the forest plan. Valuation of various forest resources by society, the Forest Service and other agencies has continued to change since the inception of this Plan in 1989. This has been expressed in public concern and action, as well as governmental action and funding of activities. This, in turn affects what can or should be monitored and how it will be done.

With monitoring, we believe the real question should often be, "Is the Forest better today than five years ago" for particular conditions or habitats. The current monitoring criteria often do not address this issue in any meaningful way.

The following sections report what is being or has been accomplished recently by particular issue or concern areas, and what potential may exist to accomplish additional monitoring work, if necessary.

Riparian Areas

No new direct monitoring activities of riparian areas are noted since last year's report. Partnerships, including some with the Arizona Game and Fish Department are possibilities, but have not been proposed at this time. Work along these lines is being accomplished for key riparian areas on a project-by-project basis.

Bridger Monitoring

Data collection continued in FY 99, with re-reading of the plots described in 1997's report under "Bridger Salvage Sales". A master's thesis of an NAU student who helped design and collect data on tree mortality and damage is expected to be published in Spring, 2000. Rocky Mountain Station carried out an inventory of understory plants in the burn area. Also, a more extensive "floristic study" was contracted in FY 99 by the Zone Botanist for the Kaibab NF and is ongoing.
The status of other Bridger activities is as described in last year's report.

Vegetation

The Forest inventoried 8,769 acres of forest with quantitative stand examinations. These exams add or update the existing 486,000 acres which have exams. These exams are used to track the overall state of the Forest in various quantitative terms, yeilding much greater precision and similar accuracy as the FIA plots. They may be used at multiple scales of planning and analysis. The Forest continues to grow tree biomass at rates far exceeding losses due to all causes. When losses of significant magnitude do occur (such as the Bridger fire in 1996) they tend to be in relatively concentrated areas. While these changes create heterogeneity on the landscape, the patterns are probably little like those of pre-European landscapes.

The Forest inventoried no acres of forest with quantitative range inventories. Past inventories, dating back to the 1950's continue to be entered into the RMRIS database. These past inventories allow for a long-term look at range condition and trend when compared to current inventories on the same clusters.

Williams Ranger District put in 70 acres of pre-treatment surveys in FY 99 with monumented points. Initially, 6,672 acres of exams were placed which were thought could meet target/threshold conditions for MSO nest sites. None of these met the definition of pine-oak habitat. The North Kaibab project to

be monitored in FY 99 was delayed due to a tree-marking paint shortage. The plots aill be established in FY 2000.

Pediocactus (*P. paradinei*) monitoring has been carried out per the Conservation Agreement. A Conservation Agreement for bugbane (*Cimicifuga arizonica*) was signed in FY 1999. A survey in North Canyon Creek drainage was carried out; no bugbane was confirmed in the survey.

Wildlife and Ecosystem Functions

See previous discussion under "Vegetation" for Mexican spotted owl microhabitat monitoring.

The following work was ongoing on the North Kaibab RD this year:

I. ***Effects of Wildfire on Densities of Secondary Cavity Nesters in Ponderosa Pine Forests of Northern Arizona.*** Bill Block, Snag Study/Monitoring NAU; Jill Dwyer Graduate student.

A. Summary of monitoring activities

This study is in its third year and consists of looking at snag use by secondary cavity nesters in low, medium, and high intensity wildfire burns. This study has plots on Peaks and Happy Jack Districts of the Coconino as well as the North Kaibab.

1. What did we learn from monitoring?

This is an ongoing study. We have not yet received a summary of the research for this year from Bill Block.

B. Recommendations

Continue for the next 1-2 years.

II. ***Snag dynamics, use and associated bird communities in wildfire-burned ponderosa pine landscapes.*** Carol Chambers, Assistant Professor, NAU; Doug Koenig Masters student.

A. Summary of monitoring activities

This study is in its second year. This is a four year project involving 2 masters students. Phase I involves investigating bird community response to recent fires (<5 years old), while Phase II will investigate response of birds to older fires (>10 years previous). During both phases, they will identify bird use of snags, snag longevity, snag spatial pattern, and other characteristics of snags that are selected by wildlife for nesting or foraging. Bird community response will cover effects on Neotropical migrants which ties back to the Bridger Monitoring and collaborative questions asked concerning Neotropical migrants.

1. What did we learn from monitoring

This is an ongoing study and the District has not received a report on this past season's work.

B. Recommendations

Continue study.

III. ***Landscape Level Competition (including habitat, prey, and predation) between Red-tail hawks and Northern Goshawks on the Kaibab Plateau.*** Teryl Grubb, RMRS.

A. Summary of monitoring activities

Second of a 4 year study. This year they monitored and surveyed the Plateau for red-tailed hawks.

1. What did we learn from monitoring

This season focused on locating nests and developing methods for the study. It appears many of the Red-tailed hawks are using old goshawk nests located in the drainages. They are still on track to begin separate master's studies summer of 2000 with Angela Gatto

concentrating on foraging ecology and Frank LaSorte concentrating on an adult telemetry study. Both should have study plans available by about April 2000.

B. Emerging issues

As we implement the goshawk guidelines, areas of the forest may become more open. This creates concern for increased possibilities for direct competition between red-tail hawks (open forest habitats) and northern goshawk (more closed habitats). In addition, there is an opportunity for disturbance monitoring utilizing the red-tailed hawk as a surrogate for the goshawk. The red-tailed hawk is a raptor that is very common and is not T,E or S, nor is it a species of concern. Yet we can learn from its behavior to such disturbances as hauling, planting with augers, road maintenance, etc. and in the future apply what is learned towards minimizing and/or eliminating disturbance to active goshawk pairs, while still meeting other management objectives.

C. Recommendations

Continue for next two-three years. The potential is great for this study to branch out in the near future.

IV. ***Northern Goshawk Demographics on the Kaibab Plateau of Northern Arizona***. Richard T. Reynolds, RMRS

A. Summary of monitoring activities

This study began in 1991 and has completed its ninth year looking at territory occupancy, fecundity, site fidelity, reproduction and other demographic parameters. This study is expanding into the effects of prey densities on reproduction. This study is of extreme importance due to the Kaibab population being the largest known population of goshawks in North America. This study may have a major influence on the status of goshawks in the West.

1. What did we learn from monitoring?

   Greater than 95% (135) of the existing territories have been located on the Kaibab Plateau and it is just in the last two years of the study that enough information has been accumulated so that researchers can begin to determine how and if management activities are impacting the goshawk population on the Plateau. During that time, researchers have observed a possible cycle in small mammal populations, and goshawk occupancy and reproduction.

B. Research needs identified

1. Effects of implementation of goshawk guidelines on goshawk reproduction.
2. Effects of human disturbance (e.g. logging activities, recreation activities, etc.) on goshawk reproduction.

C. Barriers to effective monitoring

Consistent, long term funding.

D. Emerging issues

1. Development of a reproductive/occupancy monitoring plan for after completion of Richard T. Reynolds study.
2. Effects of implementation of goshawk guidelines on goshawk reproduction is becoming a major issue for outside groups.
3. Possible petition (again) for listing by USFWS in 1999.

E. Recommendations

1. Continue demographic study for minimum of 1-2 years.
2. Develop and implement a reproductive/occupancy monitoring plan with R.T. Reynolds and other goshawk Biologists (e.g. P.L. Kennedy, Colorado State University)

3. Develop and implement a disturbance study using the Red-tailed Hawk as a surrogate species (see T.Grubb study)
4. Develop and implement a study to evaluate the effects of implementation of goshawk guidelines on goshawk reproduction. A major commitment from the Forest, Region and Research Station is needed to undertake this huge, long term study.

V. ***Development and Testing of Artificial Bat Roost Structures: Bat Bark.*** M.S. Siders and D. Garcia de la Cadena.

A. Summary of monitoring activities

Bat Bark has been installed on 67 trees in 11 locations on the Kaibab Plateau. These trees were monitored for bat use during the summer using both ocular estimations Only the original 40 (24 polyurethane, 17 fiberglass) bat barks were monitored this year. Additional bat bark (21 multi-chamber, and 5 original fiberglass design) was installed in October 1999.

1) What did we learn from monitoring?

Of the 24 polyurethane and 16 fiberglass Bat Barks monitored in 1999, 18 (45%) showed signs of bat use. Nine (37.5%) polyurethane and nine (56.2%) fiberglass Bat Barks showed signs of bat use. Anabat sound files were analyzed from 1998 data. Species using bark was determined to be *Eptesicus fuscus*, *Lasionycteris noctivagans*, *Lasiurus cinereus*, *Myotis thysanodes*, and *Myotis volans*.

2) What are we doing about it?

Continuing to monitor use. Begin monitoring the multi-chamber bat bark design to determine if it will be used by larger colonies. We hope to use infra-red video equipment during the summer of 2000 to get a better idea of frequency of use, and to develop a video to be used in the Visitor Center for interpretation purposes.

B. Barriers to effective monitoring

Funding.

C. Emerging issues

Public interest in purchase of the Bat Bark for their home use, or other institutions.

D. Recommendations

Continue for monitoring and development for the next one-two years.

VI. Peregrine falcon monitoring.

A. Summary of monitoring activities

Monitored 1 peregrine eyries this seasonas part of the requirements of the Biological Opinion for East Rim Overlook. Four visits per site.

1. What did we learn from monitoring?

East Rim peregrine eyrie was not active.

2. What are we doing about it?

a. Continue to monitor this and other eyries as time and funding permits. In order to stretch our resources, we work cooperatively with the Arizona Game and Fish Department and/or recruited volunteers in the past.

b. Progress moving toward desired future conditions. Although the species has been delisted, monitoring needs to continue for five years post de-listing.

B. Barriers to effective monitoring

Funding and locating skilled volunteers.

C. Emerging issues

The peregrine falcon has been delisted, however monitoring needs to continue for five years

post de-listing. NEPA process for grazing allotments on the District (Kane Allotment) will require that the District monitor the peregrine eyries associated with the allotments being considered.

D. Recommendations
Continue for next five years to determine activity for all known eyries.

VII. *Greater Western Mastiff Bat Monitoring*

A. Summary of monitoring activities
Trapping and radio-tracking of mastiff bats (*Eumops perotis*) to determine roost sites and roosting habitat has been an ongoing project since first capturing mastiffs in 1995. This resulted in a range expansion for the species. This year we were successful in locating five roost sites.

1. What did we learn from monitoring?
Mastiff bats appear to roost in very tall cliffs in low elevation desert habitat in the Grand Canyon and forage on the Kaibab Plateau in high elevation open meadow habitat, traveling >20 miles each way. They appear to be roosting in one general area of the Grand Canyon. All roost sites located in 1999, the one roost located in 1998, and the general roost area located in 1997 were all within about a 5 mile radius area along the Colorado River corridor. Although we capture many different bat species at various water sources on the district, mastiff bats have only been captured at a select few large ponds. These water resources may be a key habitat feature for this species.
2. What are we doing about it?
Trapping success was low in 1999 due to cold rainly weather. Mastiffs captured in 1999 were from only one location. The roost sites we located were all in the same general location of the Grand Canyon. In order to determine if this area of the Canyon is the main concentration for mastiff roost habitat, mastiffs trapped at other locations on the Kaibab Plateau should be radioed and tracked to determine if they also roost in this general location.
Availability of water for bats is difficult to determine, but should be evaluated. A research project to determine swoop zones for several bat species has been proposed by the Arizona Strip BLM office. We have commented on the proposal and sent a letter of support for the project to the AGFD Heritage Program where a proposal was submitted by the BLM. They may use some known bat trapping sites on the North Kaibab as part of their study.

B. Barriers to effective monitoring
Funding.

C. Emerging issues
Demands of lactation should force lactating female mastiff bats to choose the most efficient resources to use, and yet they travel long distances to forage and drink on the Kaibab Plateau. The plateau may have key resources needed for the survival of this species. These may be water and/or insect prey species.

D. Recommendations
Although we have worked with GCNP on this project in the past, greater participation should be encouraged. Additional research on swoop zones, and insect prey species for bats should be encouraged.

The following work was ongoing on the Williams RD this year:

I. Snag Longevity and Abundance. Joe Ganey, RMS – Flagstaff.

A. Surveys of selected sites to establish baseline data that will be used to determine snag densities and longevity or trends. The first year of data collection has been completed and the results published in Forest Ecology and Management. The citation and conclusions are discussed under Wildlife 6 in the Monitoring Plan section below. Plots will be resurveyed in 4 years.

B. Emerging Issues

The minimum Forest Plan standard of 2-3 large, tall snags per acre is probably higher than the landscape average has ever been, even in either pre-European settlement times or unlogged, inaccessable current forested areas.

C. Recommendations

Continue the study. Consider other studies that look at the value of "green snags" (live trees with structural defects). Consider changing (lowering) the snag standards in the future.

II. Rx Fire Monitoring Ed Johnson, Kaibab NF

A. Established monitoring plots on the GrapevineRx Fire project area.

1. Tree mortality by four size classes in pine, oak, pinyon, and juniper, reductions in down material, and snag loss were noted. Large tree mortality was high in the pinyon pine (42%), but within the acceptable range of tolerance for other species. Percentage loss of snags and large down woody material was high, but actual numbers of pre-burn snags and down logs were low to begin with. The tree mortality (which is on-going) has resulted in higher post-burn and down woody components than prior to the burn.

B. Emerging issues

The loss of large trees, snags, and large down woody material is of concern to biologists, as these components are important to wildlife. This concern is partially offset by the creation of snags and down woody material resulting from the burn. It is hoped that continued monitoring over several burn projects will give us a good understanding of what is actually lost, and help us to prescribe burn conditions and mitigation measures that will reduce the loss of these valuable habitat attributes.

C. Recommendations

Continue to monitor future burn projects, and work cooperatively with the Arizona Game and Fish to keep them informed of monitoring results, and to possibly obtain assistance in monitoring activities.

III. Forest Restoration Project NAU, Southwest Forest Alliance, Kaibab NF and others.

A. Summary of monitoring activities

This project looks at some effects of a particular approach to "restoration" in the Frenchy area. Treatments on 37 acres have been carried out. Pre- and post-treatment measurements have been carried out. Results showed that no trees were cut in 48% of the stand, with 67% of all trees cut 5" dbh or less in diameter. Average basal area went from 95.7 square feet pre- to 79.1 post. With this level of treatment, there will limited diameter growth response, and no increase in forage production.

This year, 177 pre-treatment plots were also installed over about 465 acres within the adjoining Frenchy EMU project to be able to compare vegetative responses from different treatments, not just "restoration" treatments.

B. Emerging issues

This project represents an effort to collaborate with both the Southwest Forest Alliance and NAU in how to approach restoration of SW ponderosa pine forests heavily impacted by logging, grazing and fire-suppression

C. Recommendations

No progress was made this year on the planning due to a lack of needed proposed treatment descriptions by the Alliance. The Forest will be evaluating the Alliance's commitment to collaborate on this project this year to determine whether to continue..

IV. Effects of Fire and Fire Surrogates. Carl Edminster, RMS – Flagstaff and Mark Herron, Kaibab NF, and others.

A. Summary of monitoring activities
Two of ten research plots in fire-dependent ecosystems are being established on the Williams RD in the Frenchy EMU to assess the ecological consequences and trade-offs of various management practices to reduce fire hazards. Work involves measurement of vegetation, wildlife, soils/hydrology, fuels, insects, economics, and social variables. Plots are to be 160 acres in area, with 40 acres in each of burn only, tree-cutting only, a combination of the two and no treatments.

B. Emerging issues
There is an opportunity to determine how "much" must be done to gain resiliency in our ponderosa pine systems and what the various costs and benefits of practices are in a comparative way. We may have the opportunity to move beyond posturing about what the relative benefits of various approaches are (from "Restoration" to "No Action").

C. Recommendations
Continue project. The potential is great for this study to bring various groups along in a collaborative way if they can be involved in the project soon with regard to its purpose and methods.

V. Rabbitbrush Control. Paul Webber and Derek Padilla, Kaibab NF.

A The district is carrying out an *ad hoc* study seeking to control rabbitbrush through repeated burnings. Past attempts to control rabbitbrush with burning have not been effective. This attempt involves repeated burning, with the first burn occurring during a drought when the plants are presumably stressed already. The first burn was conducted in 1997 after a severe drought and resulted in about 15% mortality. Grass was planted to carry a follow-up burn in 1998 but the seeding was essentially a failure. The District tried a sterile annual grass to create a fuel bed for another burn. This was not successful either in creating a sufficient fuelbed. The Williams District is still monitoring the project with mortality plots It appears that with last year's rain, there may be a sufficient fuelbed to try to burn again next year, and achieve additional mortality.

VI. Grass/forage Response from Treatments in Pinyon-Juniper Type. Mark Herron, Kaibab NF

Pre-treatment photo points were established in nine different treatment units in 1995. Treatment occurred from 1996-98. Most juniper greater than 5" dbh were removed. Last year (1998) photos were retaken at four plots to document conditions after harvest and prior to burning. Additional non-commercial tree removal and broadcast burning still need to occur in some units. Photos will be retaken in all nine units following post-commercial treatments, and at 2-5 year intervals after that. Time-interval photo records will give us a visual record of treatment response. At this time, it is too early to fully assess results.

Recommendations

Continue to retake photos at established points and to assess results.

VII. ***Snag Production from Basal Burning.*** Chuck Nelson, Ed Johnson, Kaibab NF

Basal burned eight trees to create wildlife snags. All trees have died; one fell over, and half of another tree fell over. Some activity in one tree, but no cavities were noted.
Recommendations
Keep monitoring.

VIII. ***Snag Production from Innoculation.*** Chuck Nelson, Ed Johnson, Kaibab NF.

A. In 1996, innoculated 60 trees with heartrot fungi to produce primary cavity-nesting habitat. After two years, one tree had died, and another tree had three cavities started, but no apparent nesting had begun. There was no activity in the other 58 trees.
B. Recommendations
Keep monitoring. This is a ten-year monitoring study.

IX. ***Grazing Utilization in Several Allotments on the South Zone.*** Derek Padilla, Tom Matza, Kaibab NF.

A. Occular inspections were performed to determine utilization. Out of six allotments inspected, one indicated forage use right at allowable use, and the other five showed forage was being utilized at levels substantially below allowable use.
B. Recommendations
Continue to monitor use on various allotments yearly to ensure use does not exceed allowable limits.

X. Spotted Owl Monitoring/Surveying. Jennifer Monahan, Kevin Whelan and Kevin Probst, Kaibab NF.

This past summer a total of 4,943 acres was surveyed to Region 3 protocol in one area on the district. No owls were found from the survey. Additionally 1 PAC on the district was monitored and had confirmed occupancy in it. We were unable to confirm reproductive success however.

XI. Northern Goshawk Monitoring. Jennifer Monahan and Chuck Nelson, Kaibab NF.

In the 35 territories that were monitored this year (including historical territories), 25 had no response, 10 of them were confirmed occupied. Of those, 8 nested. Reproduction was confirmed in 5 of the 8 territories, with 7 fledglings produced. A total of 8,926 acres were surveyed/monitored this past year.

Appeals/Litigation/Large FOIAs

The most notable appeal filed in 1999 on the Kaibab NF was over the Regional Forester's decision on the Tusayan Growth EIS. Every timber sale decision made in 1999 was appealed. All decisions except one were affirmed by the Appeal Deciding Officer. The exception was one vegetation treatment project (including a timber sale) which was remanded.

The Forest began active use of the national FTP (file transfer protocol) site to provide information requested in several FOIA requests this year. These were primarily, but not exclusively for GIS coverages. This practice – a rudimentary e-FOIA process – has reduced the impact of providing this type of information on the Forest Service whicle speeding up response times to requesters.

Social, Economic and Ecological Forest Plan Objectives

The objectives in the Kaibab Forest Plan are expressed in terms of timber sale outputs, types and amount of vegetative treatment, rights-of-way acquired, recreation investments, ORV closures, visual quality objectives and old growth allocated. Social objectives are not directly addressed in this Plan. Consideration to this will be made in a future amendment.

The latter four of the listed objective sets have been largely attained. The 6/96 amendment essentially recognized a shift which had already taken place on the Kaibab NF with respect to the first two objectives. Timber production is less than 1/3 of ASQ and is expected to remain in that range or less. Uneven-aged management, hardly even mentioned in the 1988 Plan, is now the norm on this Forest, along with substantially more thinning of small-diameter trees.

Economically, these changes contributed to the closure of several sawmills, most notably, Kaibab Industries in Fredonia. Review of 1990 Census data and subsequent Utah Job Service and local crime information indicates both the social and economic effects were profound. A follow-up has not recently been done to identify attenuation of effects, but it seems quite likely they have diminished over time.

Changes in public expectations about how the Forest is managed are generally being accomodated. The Forest has been able to keep up with increased recreational demand to this point, although a number of problems are looming, especially with respect to deteriorating infrastructure.

There may be a trend toward less polarization of the public involved in forest management issues with increasing collaborative efforts, public involvement plans and other communication. Part of this possible trend may be related to the maturation of the environmental movement. Some groups seem fundamentally oriented toward "no compromise" while others are focusing on collaboration with various consumptive users. This is leading to a broadening of publically expressed views about issues, as was evident with public response to the Tusayan Growth EIS alternatives. Some environmental groups supported the selected alternative which includes planned and strictly regulated development while others opposed any action by the Forest Service that would lead to increased (planned) development. Last year the Forest began a dialogue about old growth management on the Forest. People representing various interests, from academia to industry and environmental groups are participating in this effort. A management proposal is now being formed by one diverse sub-group. Another proposal, building on the first is expected shortly. These proposals may provide the Forest a way to move ahead with diverse interest groups in old growth management.

Monitoring Requirements of other Laws

Clean Water Act, Clean Air Act, Endangered Species Act

We comply with the Clean Water Act through the implementation of Best Management Practices (BMPs) on our projects. We include these in design of allotment management plans, timber sales and road work. We also maintain contacts with the Arizona Department of Environmental Quality on large project proposals.

The National Forests in Arizona fund a position with ADEQ to coordinate our prescribed burning programs and ensure compliance with the Clean Air Act. This position and the relationships built between agencies has been quite successful in maintaining good will while accomplishing needed work.

The Endangered Species Act is complied with through project designs which meet recovery plan requirements and maintain the viability of all TE&S species. We also consult with the USF&WS on all

projects where this is required. Biological Assessment and Evaluations must be completed prior to approval of NEPA decision documents and are now maintained in the Supervisor's Office.

Research Needs Update

Many needs are previously discussed by project, above, in the Recommendations. For example, with northern goshawk, it is essential to complete the demographics study underway by Dr. Reynolds. This issue is discussed under "Wildlife", above.

Other needs include:

Forest restoration - This field is being actively pursued by Drs. Covington and Moore at NAU and the Southwest Center for Biological Diversity, regionally. It includes at least one proposal on this Forest which has had 37 acres partially completed on the ground to date..

Pine-oak - We seem to have lost a large number of our larger oak stems, mostly due to fuelwood cutting, especially by theft. These large oak appear to be quite important to forest structure and function in much of our forest. We have very little information to apply in replacing these. We think thinning and some burning will help but don't really know. Research into methods and time factors involved would be helpful.

Pinyon-juniper/grassland pre-European settlement conditions - We are beginning to get a fair amount of information on conditions in ponderosa pine. This information is quite helpful in getting some idea of the relative effects of changes proposed by management and what the costs and benefits might be to an ecosystem where life has co-evolved under relatively stable conditions for the past few thousand years. Pinyon-juniper is a very common cover type on the Kaibab and in the Southwest. It would be helpful to have similar information for these ecosystems, as well.

Smoke management near populated areas - As we move into prescribed burning in the urban interface, the issue of smoke in populated areas is likely to grow. It would be important to get good distribution of existing research, and possibly new research started.

Emerging Issues and Trends

On this Forest, emerging issues are fairly typical of all Southwestern Forests with some exceptions. Budgets are declining faster on this Forest than most. Collaboration and partnering is increasing. Riparian issues, including T&E species associated with them are not becoming as critical as elsewhere.

We are experiencing changes in who uses the Forest and how they (and we) view it. Up until now, increases in recreational use have been within the bounds forecast in the 1988 Plan but the type of use is changing. Mountain bikes are growing popularity. We expect increased fees and increasing limitations on visitation to Grand canyon National Park to increase use of the Forest, including wilderness areas. The North Kaibab RD is partnering with NAU to implement a campsite monitoring and inventory sample in the Kanab Creek Wilderness this year. The National Recreation Use Monitoring project will give us a baseline measurement of the number of people recreating on the National Forest. It will also give us an idea of where the recreation use is occurring (wilderness, general forest area, or developed site), visitor satisfaction and the amount visitors spend on recreation pursuits. The South Zone (Williams and Tusayan RD) are also starting a planning process to look at existing recreation uses and conditions, and will develop some desired condtions. NAU will assist the Forest with the project by providing survey information about recreation visitor desires, willingness to make trade offs and awareness of

local recreation opportunities. The planning process will provide information to be used in the upcoming Forest Plan revision. Two spinoffs of the planning described above will be an update of the Recreation Opportunity Spectrum and progress toward conversion from the Visual Management System to the Scenery Management System.

The risk and fact of catastrophic fires are being realized now, especially in the urban interface. People are increasingly supportive of action, although there are also those adamantly opposed to management to either mitigate risk or (especially) to salvage timber after large fires. A monitoring plan for the Bridger Salvage Sales has been established and is described above.

The Forest is shifting much of its work emphasis to the range program due to several factors including compliance with the Burns Amendment schedule, the number of permits expiring soon and public interest in grazing effects.

Antelope populations and their declining habitat began to attract more attention from both the Kaibab and Coconino National Forests after the Arizona Game and Fish Department approached the Forests with some population tracking information. Restoration of corridors, if not entire grassland/savannah areas, has become a planning issue on the Frenchy landcape and is actively being discussed at a multi-district scale across the two Forests. This issue is likely to become linked with efforts aimed at maintaining and restoring prairie dog and/or ferret populations over time.

Current and Potential Monitoring Partnerships

Most of our current monitoring partnerships are with NAU (Bridger Salvage Sales, Kane Ranch, Kanab Creek Wilderness and Frenchy EMU), Arizona Game and Fish Department (Bridger Salvage Sales, bats and other wildlife populations, maintaining the Heritage database and water development maintenance) and Rocky Mountain Station (uneven-aged growth plots, goshawk demography).

Opportunities for partnerships probably exist for monitoring populations of rare or endangered species, including the Paradine plains cactus and noxious weeds through groups such as the Arboretum at Flagstaff and even ADOT. Others who might be interested in helping monitor economic, social and biological conditions include, Grand Canyon Trust, the Southwest Center for Biological Diversity, permit holders and local residents. These opportunities have not yet been seriously pursued.

The Forest has begun a discussion with scientists with the Rocky Mountain Station and Northern Arizona University, along with Arizona Game and Fish Department personnel to define and focus monitoring on what may be feasible within our budgets and what may be both possible and desireable with outside help. The Forest hopes to eventually produce a “wish list” of research and monitoring tasks that could be used to help evaluate and guide management adaptively.

Barriers to Effective Monitoring and Evaluation

The Forest Service has released draft forest planning regulations which would require extensive, well-designed and reviewed monitoring of various sustainability indicators. If these were adopted, much greater emphasis and expenditure on monitoring and evaluation would likely result.

The biggest barrier to effective monitoring and evaluation appears to be a lack of emphasis and resource allocation, both internally and externally; which other mandated or important activities will the Forest and/or others drop to do this work?

The Forest's vision emphasizes a Learning Organization. As we begin new projects with this in mind, opportunities have begun to emerge that are likely to lead to more monitoring and evaluation. The Natural Resources Group is drafting a plan to evaluate the status of project monitoring plans documented in EAs over the past several years. Besides verifying the level of implementation, effectiveness monitoring will also be carried out and evaluated for some items.

Combining the Learning Organization with a second branch in the vision - Relationships - other opportunities are beginning to emerge. In FY 1999, two demonstration projects involving other partners, monitoring and evaluation began. Both involve NAU researchers in restoration efforts. The Grand Canyon National Park is involved in one of these and the Southwest Center for Biological Diversity in the other.

Monitoring Plan

Details of the Forest Plan Monitoring Items are listed at the end of this report. A summary of Monitoring Plan accomplishment for 1998 follows. Many of these items are previously reported in the Forest's FY 1999 Final Management Attainment Report (MAR), dated October 20, 1999 (file code 6520).

Resource Addressed	Number of Items	Number Monitored
Timber	10	9
Protection	1	1
Range	4	4
Recreation	6	1
Heritage	3	3
Wilderness	1	0
Visual	1	0
Soil	1	1
Land Management	1	1
Wildlife	29	13
Facilities	1	1
TOTAL	**57**	**34**

Many of the items for wildlife are monitored by the Arizona Game and Fish Department (population numbers). Others are probably no longer appropriate with the change in timber harvest practices on this Forest. These will be addressed in a future Plan amendment. For all monitoring, budget reductions have been a major impediment to effective monitoring, along with a lack of emphasis on it.

Detailed Forest Plan Monitoring Information

Nine Timber items have been monitored. Items 1-5, 8 and 9 all deal with outputs of a particular type, either implementation of particular prescriptions or volume produced. Case law since the Plan's inception has shown that this sort of information is not part of a Plan decision and does not require evaluation on that basis. Some of the measures are useful for tracking the rate at which the Forest is dealing with currently perceived issues of forest health (especially thinning items) or contributions to local community economic health (volume produced items).

Timber 1	Pre-commercial Thinning (MAR 20.0)	1510 acres

Timber 2	Commercial Thinning	6185 acres

Neither of the two thinning items are being accomplished at a rate which will keep up with growth. The reasons for this are complex and involve conflict with some Standards and Guidelines (including those for wildlife cover, goshawk and Mexican spotted owl management), economics (especially in the case of pre-commercial and pulpwood product thinning), and appeals/litigation (which has the effect of creating cascading delays in project implementation while running up costs).

Timber 3	Shelterwood Seed Cutting	206 acres
Timber 4	Shelterwood Removal Cutting	159 acres

These two items are well below the expected amounts this far into the Plan. As the Plan has been amended to emphasize old trees and uneven-aged management, these are unlikely to rise during the life of this Plan. The effects of the changes are evaluated in the Regional EIS which amended the Plan. Tracking acres of even-aged and uneven-aged regeneration generically would probably be more responsive to current issues. This will be considered for a future amendment. In 1999, the Forest accomplished the following in other types of harvest:

Uneven-aged (Group & Individual Tree Selection)	164 acres
Sanitation (Salvage and Mortality Salvage)	76 acres
Clearcut (Patch)	0 acres
Special	0 acres

Timber 5	Restock. of Regen. Cut	5,538 acres
Timber 6	Restock. of Planted Areas	of "Need"
Timber 7	Review of max size limits	N/A acres

The acreage of reforestation need (due to management treatments) declined from 9291 acres in 1997 and 7,265 acres in 1998. The two restocking items above are reported together; planted areas typically have quite a bit of natural regeneration in them as well. First-year survival was 85% (1,277 acres), while third year ranged from 73% (222 acres) in ponderosa pine to 79% (103 acres) for both Englemann spruce and Douglas-fir. The number of trees per acre planted on this Forest is typically more than enough to adequately restock openings after accounting for these mortality levels. The Forest has been largely successful in regenerating harvest openings in a timely manner in the past. Opening size seems to bear little relation to success. A better predictor of regeneration success in harvest (or any other types of) openings would be the density of ungulates, especially elk during the first several years following regeneration. With the major shift in regeneration methods incorporated in the June, 1996 amendment to the Plan, this monitoring item has little further utility in any case. The Forest will consider dropping it in a future amendment.

No openings (R3 Guide definition) were created in 1999 through timber harvest. The opportunity to evaluate this measure does not exist for harvest openings created in 1999.

Timber 8	Net Sawtimber Sold	7,743 MBF
" "	Harvested	11,562 MBF
Timber 9	Net P-J Fuelwood Sold	2,483 MBF
" "	Harvested	2,880 MBF

The majority of the wood sold in 1999 occurred first and fourth quarter of the fiscal year (10/98 through 12/98 and 7/99 through 9/99)on the North Kaibab Ranger District. Timber from North Kaibab RD sales has been competitively purchased due, primarily, to a larger average diameter, and is being delivered to sawmills in Arizona, Utah, Idaho, Montana, and California.

There were three multi-product sales offered on the South Kaibab in FY-99 (sales which include both sawtimber > 9.0" DBH and pulpwood between 5" and 8.9 " DBH). All of these sales received "No Bids" due, primarily, to the lack of an outlet for the pulpwood sized material. In the past, purchasers were able to move pulpwood to Stone Container's pulp mill in Snowflake, AZ but that company has converted their mill to 100% recycled material and no longer utilizes raw material in their production. There are currently two multi-product sales under contract (since 1994) which remain unlogged due to the lack of an outlet.
Some headway has occurred locally on the South Zone of the Forest with attracting a new, small business to the area to utilize at least some of the small diameter timber. Northern Arizona Wood Products has set up a small plant just east of Williams and has found a market niche for peeled posts, low grade telephone poles, guard rail posts, vigas and latillas as well as firewood. However, the purchaser can only take relatively small amounts of wood and won't make any large dent into the overall overstocked conditions which are prevelent.

Efforts are underway locally to attract new industry to the pulpwood and timber supply. There have been several recent inquiries from existing mills and/or loggers in Utah and Colorado about unsold sales on the Forest. It appears that most inquiries would be for purchase and back-haul to existing mill sites. The interested parties are hauling materials from their mill sites to markets in Phoenix and Las Vegas and are looking to improve the economics of their hauling.

This Forest uses commercial timber harvest primarily to meet wildlife and forest restoration objectives and there is concern about the short and long-term costs of not having the "tool" of timber harvest. Timber sales, whether or not they loose money, seem to be more economic than paying someone to burn or otherwise dispose of generally smaller trees which are competing with other trees and other native vegetation. If we do not accomplish the thinning (in part, due to short-term economics), we face the increased risk of much higher costs in the future in fire suppression, fire rehabilitation (especially erosion control and rebuilding improvements) and forest restoration (including reestablishing some trees and controlling noxious weed invasions).

Meanwhile, demand for pulpwood is rising in the US and world-wide and most markets outside the U.S. are fully using their recycleable paper materials. The U.S. is also moving to this position. The current lack of interest in pulpwood seems unlikely to persist for more than a few years. The change in industry structure may necessitate an indepth review of the Forest's timber program of the future. Adjustments may need to be made for effective management of timber resources into the future.

The Forest has not come anywhere near meeting 75% or more of the ASQ (77 MMBF/Yr) in several years. It is not expected that this will occur in the foreseeable future for reasons discussed in the 1993 Five-Year Monitoring Report. The objectives of projects within the amended Plan are fundamentally different than they were when the original Plan was crafted. Now, many trees are generally intended to be carried on uneven-aged sites for a minimum of 200 years. Additionally, more of the biomass produced is intended to provide structure (snags, down logs) and function (nutrient cycling with fire, old growth and very large trees). If a new ASQ were calculated today, it would be much lower than 77 million board feet per year.

Timber 10	Evaluate Unsuitable Timberland	~1,309,000 acres

A timber suitability analysis was carried out in FY 99 for the entire Forest. This analysis is documented in a letter to the Regional Forester dated September 21, 1999. A tabular summary of the acreage is listed on the following page.

Timber Suitability Summary - Kaibab NF (NFS Lands)					
		1999			1987
Category Description	TIMCO	South	North	Forest	Forest
Not Forested	001-299	128842	119664	248506	140144
Not Forested, Examined		11731	123	11854	
change					**77%**
Withdrawn	300-499	9555	48882	58437	51045
Withdrawn, Examined		3877		3877	
change					**14%**
Suitable, Timber Emphasis	500-599	198058	205833	403891	479132
Suitable, Timber Emphasis, Examined		148478	185488	333966	
Suitable, Other Emphasis	600-699	3731		3731	
Suitable, Other Emphasis, Examined		3258		3258	
change					**-15%**
Unsuitable	700-799	61064	17544	78608	167847
Unsuitable, Examined		23588	5296	28884	
change					**-53%**
Incompatable with multiple-use	800-820	49172	48133	97305	11236
Incompatable with multiple-use, Examined		35296	35982	71278	
Not appropriate (cost)	850-899	139		139	
Not appropriate (cost), Examined		67		67	
change					**767%**
Non-industrial species	900-999	437631	217846	655477	685049
Non-industrial species, Examined		74908	11647	86555	
change					**-4%**
Balance	Blank	19891	0	19891	
All acres		**908083**	**657902**	**1565985**	**1534453**
change					**2%**
All acres, Examined		**303271**	**238536**	**541807**	
Percentage Examined		**33.4%**	**36.3%**	**34.6%**	

Protection 1	Destructive I&D increases after tree-cutting	0 acres

The 1999 aerial pest detection survey, as with past annual surveys have documented no unacceptable increases in tree mortality resulting from silvicultural activities. To the contrary, much of the mortality reported for the entire period appears to be associated with densely-stocked tree conditions combined with drought and/or fire.

Range 1	Wild Burro Populations	8 animals

Several surveys were completed this year in the Double A Wild Burro Territory. Eight burrows were observed: 2 at MK Tank, four at the Double A headquarters area and 2 at Jim Rivers Tank.

Range 2	Permitted Grazing Use and Grazing Capacity	72,720 AUM

Grazing Capacity is estimated to be 8,705 AUMs lower than permitted, or approximately 64,000 AUMs. Actual use in 1999 was roughly 53,470 AUMs with approximately 19,250 of approved non-use. There are four grazing units where the data supports reduction in numbers and possible other management changes, such as modifications in season of use.

Range 3	Range Structural Improvements (MAR 30.0)	8 structures
Range 4	Range Non-structural Improvements (MAR 29.0)	430 acres

Planned improvements were accomplished. Structural work was mostly reconstruction of older tanks and new roadside tanks to inprove distribution patterns. Non-structural work was aimed at improving forage/cover ratios, overall capacity, range condition and trend as well as watershed values. Most of these projects were targeted to former treatment areas which have been inventoried with expansion of woodland trees.

Recreation 1	Public Sector Developed Rec. Use	N/A RVD
Recreation 2	Private Sector Developed Rec. Use	N/A RVD
Recreation 3	O&M of Public Sector Developed Rec. Sites (MAR 26.0)	1422 MPAOT-Day
Recreation 4	Private Sector Developed Rec. Site Const.	N/A PAOT
Recreation 5	Dispersed Rec. Site Investments	N/A PAOT
Recreation 6	Wildlife and Fish Rec. Use	N/A WFUD

One of the recreation goals is being reported this year, MPAOT-Days. The Recreation Use Monitoring project will also provide number of visitors. Recreation Visitor Day information is not being emphasized at this time. Several new databases are being developed (Meaningful Measures, Infrastructure, Deferred Maintenance) which will provide the new measurements stressed by Congress and the Washington Office. Generally, the goals for recreation are being met on this Forest.

Cult. Resrce 1	Protection of Cultural Resource Properties (MAR 65.4)	170 Properties
Cult. Resrce 2	Evaluation of Cultural Resource Properties (MAR 65.2)	108 Properties
Cult. Resrce 3	Cultural Resource Inv. Non-Project Areas	7062 Acres

About 4300 acres of this total was in the Frenchy landscape. No projects are currently proposed in this area but some are expected to be proposed within a year or so.

Wilderness 1	Wilderness Use	N/A MRVD

The Recreation Use Monitoring project will provide number of visitors at wilderness sites by the end of the calendar year.

Vis. Resrce 1	Effects of Management Practices on Visual	N/A Acres

	Quality	

The Visual Resources Item is not reported this year.

Soil 1	Unsastifactory Watershed Condition (MAR 13.0)	865 Acres

Typically, the areas treated were within older pushed areas and completed using a bobcat and agroaxe.

With almost 140,000 acres of unsatisfactory watershed condition planned for treatment in the first decade of the Plan, and only about 13,500 acres (less than ten percent) completed, it is very unlikely as much of this will be directly addressed as planned. Money for this activity has been very limited. However, indirect methods of addressing the problem have been pursued. Examples include: Addressing over-stocked allotments totalling 209,000 acres and reducing use by 9725 AUMs; changes in grazing season which have effected improvement on 20,000 acres; and, fuelwood harvest in invaded grasslands and PJ designed to improve watershed condition on 6,000 acres.

The 349,000 acres of unsatisfactory watershed condition identified in the Plan are in PJ on slopes less than 40% slope. They are probably best treated with a combination of removal of invaded or overstocked PJ, grazing reductions (possibly including wild ungulates) and re-introduction of fire. Attempts to begin with fire on the Williams/Chalender Districts proved unsuccessful; even on warm, windy, dry days, the fuel (PJ with no understory) is just too discontinuous to carry fire.

LMP 1	Resource Information Management Systems, Inventory and Data Collection Systems for various resources

Fifteen national standard GIS layers have been identified, including topography (2), elevation, soils, existing vegetation, perennial streams, watersheds, range allotments, transportation, recreation sites, threatened and endangered species, land ownership and rights/restrictions. During FY 99, the Kaibab substantially completed work on the standard layers under a Regional contract that were under our influence. The rights and restrictions coverage is being developed at regional/national levels. Details of the threatened and endangered species coverage, which is tied to the State of Arizona's heritage database are still being worked out although the Forest already has the information it currently needs for management in coverages. The Forest has aslo completed coverages for cultural resource (also called "heritage") sites and surveys which provide site-specific information to managers in the GIS.

Forest Vegetative Conditions (RMRIS and GIS for Timber, Range, Wildlife and Fish Habitat and Forest Protection)

The Forest conducts two basic types of inventories of vegetative condition: Stage II stand exams, with additional information collected for snags and fuels; and, grass-forb-shrub information from range transects and permanent clusters. All inventories are added to the RMRIS database, whether they originate from post-project implementation inventories or inventories in anticipation of a future project.

Until FY 99, it was quite difficult to make detailed comparisons of forest conditions over time with Stage II data because new exams over-wrote the old exams, rather than supplementing them in

some way. This has changed and the North Kaibab RD has begun to reload old exam information. Several thousand acres have been reloaded to date. For the range transects, this is not been a problem because there is room in the database to track the information with each new survey.

Recently, funding for these surveys has declined substantially at the same time their complexity has increased. The result is greatly reduced acerage inventoried quantitatively each year. Table I summarizes inventories by the indicated time period and type during the life of the Plan and the percentage of the forested (for Quantitative Stand Exams) or National Forest (for Range Forage Exams) this represents. The acreages include resurveys; some areas have been examined more than once since 1989. Total *unique* surveys from 1989 through 1999 is about 373,000 acres.

Vegetative Inventories by Time Period and Type

Year	Quant. Stand Exam	Quant. Forage Exam
1989	86,839	0
1990	107,727	3,296
1991	80,569	1,731
1992	43,321	2,638
1993	35,856	10,259
1994	26,992	5,539
1995	17,994	12,846
1996	6,319	13,818
1997	9,481	13,950
1998	10,299	3,738
1999	8,798	0
Total	551,925	76,558
% of Area	42.2	4.8

Reductions in inventories, both post-project implementation and pre-project, impact our ability to monitor conditions for a variety of resources and concerns over time. These include habitat for TE&S species, insect, disease and fire risk, old growth conditions, timber resources and, in general, the difference between desired and existing conditions. The problem is not judged to be serious at this time, however, it is cumulative.

Transportation and Facilities Inventories

Transportation:
The transportation system inventory (Forest roads and trails) is presently being developed in INFRA, the national database. Existing transportation system information contained in PC databases, maps, project files and spatial data are being utilized to establish the database. We are anticipating the completion of a basic road and trail database and the linking of the database to GIS in FY 2000. Additional attributing, updating and maintaining of the database will continue indefinitely.

Buildings:
At this time, all the buildings on the Forest have been entered into the INFRA database.
Additional attributing, updating and maintenance will continue as required.

Cultural Resources

All heritage sites have now been digitized and attributed in the GIS for the entire Forest. The sites are linked to the CRAIS database. The Heritage resources Section is also tying digital photos to sites in ARC-Info, so a visual representation of many sites are now quickly available electronically.

Wildlife 1	Wildlife & Fish Non-structural Improvements	9672 Acres
Wildlife 2	Wildlife & Fish Structural Habitat Improvements	61 Structures

The MAR report for these items indicates 8352 acres and 0 structures for these items, respectively. The MAR system does not include treatments and activities carried out primarily for creation or maintenance of wildlife habitat unless they were specifically paid for by money allocated for wildlife management. This approach does not reflect what is actually occurring with the resources. A more illustrative approach of what the Forest is doing might focus on attainment or progress toward certain conditions, rather than just "improvements". This will be considered in future amendments whether or not our upward reporting requirements accept this type of information.

Wildlife 3	Goshawk and Spotted Owl: Old Growth Habitat	100,000+ acres

The entire Forest was inventoried to determine the "best" areas with suitable old growth or with the "best" potential old growth in 1989-1991. The "best" 15 percent of the "suitable timber base" was allocated and is recorded in RMRIS. Each Ecosystem Management Area has the prescribed 15%. Because the allocation was made based on the best within an EMA and not on each landscape block, some blocks exceed the 15% and some are less.

An additional allocation - by various means - is being made to equal at least 20 percent of the forested landscape to comply with the June, 1996 amendment. The table below shows the results of a query of the stand data base, using cover type, basal, area, number of trees per acre over diameter thresholds, and site index, where these data are available and applicable. The population the table comes from is only sites with stand exams. Actual area of sites meeting the Old Growth table criteria may be two to three times higher than the figures in the table. The stand data base does not include complete historical information, so queries of change over time are not directly obtainable.

Examined Areas Meeting Old Growth Criteria			
CoverType- Produtivity	**Southern RDs**	**North Kaibab RD**	**Forest Total**
Ponderosa Pine - H	3116	40243	43359
Ponderosa Pine - L	2533	6619	9152
Aspen - ALL	153	11781	11934
Blue Spruce - H	0	60	60
Blue Spruce - L	0	0	0
Douglas-Fir - H	0	266	266
Douglas-Fir - L	0	94	94
White Fir - H	0	3648	3648
White Fir - L	31	660	691
SW White Pine - H	0	0	0
SW White Pine - L	0	0	0
Englemann Spruce - H	0	288	288
Englemann Spruce - L	0	0	0

Spruce-Fir - H	0	4311	4311
Spruce-Fir - L	0	606	606
Juniper Woodland - H	13211	0	13211
Juniper Woodland - L	15069	0	15069
Rocky Mtn. Juniper - H	0	138	138
Rocky Mtn. Juniper - L	0	138	138
Total	**34113**	**68852**	**102965**
H- higher sites; L -Lower Siles; All - All sites			

There continues to be much controversy concerning the definition of "old growth". Science is continuing to update our knowledge on the pre-settlement forest structure. The emerging picture of "natural" forests as old growth conflicts with some values about what old growth should be. It is impossible to agree upon measures of old growth when there is no commonly shared definition. The thinking within the original Plan called for "blocks" of land allocated totally to large old trees. Science is now revealing that most large old trees in the Southwest occurred in small groups of less than an acre in association with younger trees.

We are continuing a collaborative effort to articulate the questions associated with the structure and management of old growth with an emphasis on sustainability. While we have identified catastrophic fires, insects and high site densities as major risks to large old trees, some are more concerned about the threats management brings. There currently is no monitoring prescribed in the Plan for these types of risks. We are currently addressing the questions of how many acres we have in large old trees, how these are arranged across the landscape, and how many acres are we moving into the large old tree structure on the North Kaibab RD and plan to move to similar questions on the southern districts when the initial effort reaches some resolution.

Wildlife 4	Goshawk and Spotted Owl - nest location, occupancy, and productivity.
northern goshawks	135(nk) + 47(sk, incl. 12 historic) territories 67/114(nk)+10/35(sk) occupied/checked 42+/57(nk)+5/8(sk) fledged at least one/tracked
Mexican spotted owls	6 territories 1/1 occupied/checked ?/0 fledged/tracked

The intent is to maintain population and habitat effectiveness. The habitat has been defined in the "Management Recommendations for the Northern Goshawk in the Southwestern United States" and in the "Recovery Plan for the Mexican Spotted Owl". Habitat monitoring is being done today with pre and post-stand exams. Realistic evaluations can be made to determine if treatments are valid in moving existing conditions to desired conditions.

Population monitoring is very difficult and cannot be done by only revisiting old nest sites. Population monitoring is defined for the Mexican spotted owl through the Recovery Plan. It will be done on a Region wide basis and will be very expensive. This type of intensive monitoring has never been done in the Region and it is not known if the Region will receive adequate funding. Research is doing population monitoring on the Kaibab Plateau, however, it is not being done anywhere else in the Region. Therefore, it does not provide information on the southwest population. Like the spotted owl, any population monitoring needs to be on a Region wide basis

and will be very expensive. This is true for any wide ranging species. An exception to this would be the game species currently monitored by the Arizona Game and Fish Department.

The Forest will be most effective in evaluating habitat and that populations be monitored through inferences made by changes in habitat.

Wildlife 5	Pygmy Nuthatch - amount old growth habitat	105,433+ acres

For further detail see discussion under No. 3, above.

Wildlife 6	Pygmy Nuthatch - snag densities and sizes (existing and future).	lg. snag/ac sm. snag/ac

Cover Type	Large, Tall Snags (>=18", >= 30')	Large Snags (>=18")	Small Snags (12-17.9")
Southern RDs			
aspen	..34	.36	.1.6
Douglas-fir	.41	.41	.1.7
juniper	.19	.44	.1.3
oak	.28	.45	.1.3
pinyon-juniper	.10	.39	.88
ponderosa pine	.26	.39	.76
white fir	.74	.81	.1.3
North Kaibab RD			
aspen	.14	.22	.60
blue spruce	.24	.33	.69
Douglas-fir	.43	.60	.68
Englemann spruce	.33	.52	.68
oak	.19	.29	.18
pinyon-juniper	.07	.34	1.3
ponderosa pine	.22	.33	.47
spruce-fir	.13	.19	.54
white fir	.25	.43	.59

This monitoring effort should be for the special component, snags. Snags (as well as green trees with cavities) are essential for a number of species and should be the monitoring element, not pygmy nuthatch. An inventory that includes snags is included in stand exams. For a large area the stand exam data (as stored in RMRIS) is adequate for determining density of snags. A larger sample size is necessary for accurate predictions on smaller scales. Current direction describes the desired condition of snags and reserve trees. The Forest will consider a minor Plan amendment to clarify this situation.

A research project (Ganey, Joseph L., 1999. Snag density and composition of snag populations on two National Forests in northern Arizona. Forest Ecology and Management 117, 169-178, Amsterdam, The Netherlands.) found even in forested areas that were:

- uncut (no logging or fuelwooding),
- unburned for several decades, and

- probably more densly stocked than in pre-European times

met the minimum standard on less than 1/3 of the plots. Ganey concluded the current standards for snag retention may be unrealistic and should be reconsidered. He aslo concluded additional information about the role of snags in forest structure, utility of different snag species and size to wildlife, tree mortality rates, snag longevity, the importance of partially dead trees, and the effects of fire on snags is needed to set reasonable snag management guidelines.

Wildlife 7	Turkey - roost density	N/A roosts/ac

Turkey roosts are critical only where there is a shortage of large old trees and they may be removed. Finding roosts on the North Kaibab is not critical with the current management direction of maintaining the mature forest over the landscape and the existence of abundant large old trees. On the southern Districts it is not critical under the current management where most large old trees are maintained with the exception of disease. The largest threat to this special component on the southern two Districts is fire and insects due to overstocking . There currently is no monitoring prescribed in the Plan for this risk (also see No. 3, old growth). The Forest will consider a Plan amendment to include monitoring for this risk instead, along with tree density by size class.

Wildlife 8	Turkey - population trend (Hunt Units 7-10 & 12A)	Survey counts: '88-'92 avg: 102 '93-'97 avg: 83

The above numbers do not actually reflect population estimates. Arizona Game and Fish Department monitors turkey numbers through modeling and through hunter success rates. The Department has recently discovered problems with their survey methods, which are used to report the numbers above. They are considering changes.

We have not met the Comprehensive Plan goal for turkey numbers, however, there has not been a 25% decrease in numbers.

Wildlife 9	Red Squirrel	N/A Acres

This was an issue with short rotation, even-aged management. Under the current direction, this should no longer be an issue, and is being provided for on all vegetation-modifying projects in red squirrel habitat.

Wildlife 10	Elk and Mule Deer - amount of hiding and thermal cover	N/A Acres

This was an issue with short rotation, even-aged, evenly spaced management. It is an issue when current conditions are still even-aged and there is little or no regeneration. Through a collaborative and adaptive management process current S&G's need to be reviewed.

Wildlife 11	Elk and deer - reproductive and key area parameters	N/A acres

No post-treatment monitoring has been done by the FS. Numbers of deer and elk remain either steady or on the increase. Again this was an issue with short rotation, even-aged, evenly spaced management. For some areas this may still be an issue with the current conditions.

Wildlife 12	Elk and deer - browse and forage use and age class structure of browse.	N/A acres

Browse/forage monitoring is conducted in association with allotment analysis and includes all grazing animals. No break-out of use by elk and deer has been made. Another question that is not asked is, "are areas that were historically or currently in browse being maintained or are they being lost or suppressed due to invasion of trees.?". Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 13	Elk and Mule Deer - population trends and distribution. (Hunt Units 7-10 (elk & deer), & 12 (deer only)	Survey counts: Deer: '88-'92 avg: 490 '93-'97 avg: 481 Elk: '88-'92 avg: 354 '93-'97 avg: 633

The above numbers do not actually reflect population estimates. Both elk and mule deer numbers are within the Comprehensive Plan goals. We presently have the risk of elk numbers exceeding these goals. These are available from Arizona Game and Fish Department.

Wildlife 14	Tassel-eared Squirrel - amount of suitable habitat	N/A acres

The S&Gs were written to be used with the R03WILD habitat model. This is a very crude model based on even-aged, even-spaced, and short-rotation management. R03WILD is not able to take into account either landscape patterns or inter-stand variation. Current direction is for uneven-aged, mature forest, with irregularly spaced trees which should benefit the tassel-eared squirrel. However, there is not agreement with landscape patterns and further work needs to be done collaboratively to seek consensus.

Wildlife 15	Tassel-eared Squirrel - population trend	N/A numbers

According to the Plan, Arizona Game and Fish Department surveys are to be used. However, the Arizona Game and Fish is developing a reliable technique for surveys. The research branch of the Department is currently doing a multi-year study with this objective. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 16	Hairy Woodpecker and Yellow-Bellied sapsucker	snag densities, sizes, and species (existing and future)

See No. 6. There need be only one monitoring item for snags. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 17	Plain Titmouse	amount of old growth habitat

See No. 3. There should be only one monitoring item for old growth. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 18	Plain Titmouse	snag densities and sizes

See number 6. There should be only one monitoring item for snags. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 19	Antelope - forage use	N/A acres

Browse/forage monitoring is conducted in association with allotment analysis and includes all grazing animals. No break-out of use by antelope has been made. Another question that is not asked is, "are areas that were historically or currently in browse being maintained or are they being lost or suppressed due to invasion of trees.?". Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 20	Antelope - population trends (Hunt Units 7-10 & 12)	Survey counts: '88-'92 avg: 424 '93-'97 avg: 416

There is ongoing concern about the stability of the antelope population in northern Arizona. Development of housing, commercial areas and various corridors are restricting antelope movements as well as removing habitat. Also tree encroachment into former grasslands and savannahs seems to be having a similar effect. This problem is currently being looked at by both the Department and the Forest. It is discussed above, in the Emerging Issues and Trends section. Population data is available from Arizona Game and Fish Department.

Wildlife 21	Cinnamon Teal - amount of suitable nesting habitat.	N/A acres
Wildlife 22	Cinnamon Teal - nesting success	N/A numbers

The cinnamon teal was selected as an indicator because of the importance (rarity) of wetlands. A more appropriate measure may be the health of the existing wetlands not nesting habitat and nesting success. Therefore, monitoring should deal with the wetlands and not one species. If the wetlands are in good condition, then, one can infer that cinnamon teal, and other wetland dependant species, are in as good a condition as one could expect. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 23	Riparian Areas - habitat condition	N/A acres

Most of the riparian areas were inventoried in 1990. There is no satisfactory rating system at this time. Riparian areas have not been systematically inventoried as to condition class and no quantitative monitoring has been done to determine changes.

Several wetlands have been enhanced through exclusion of livestock use and have shown significant improvements. Many of the other wetlands have improved through management of livestock. For example, habitat condition in Kanab Creek Wilderness, the largest riparian area for

the Kaibab N.F., is steadily improving through grazing management that only allows grazing during the winter season and soon, it may not even be grazed at all.

Based on an allotment analysis system that keys on those allotments where there are problems and the increase in areas excluded from livestock, Forest wetlands, as a whole, are improving in condition. This monitoring item would probably also cover the intent of Nos. 21, 22 and 24 effectively.

Wildlife 24	Riparian Indicator Species - (Lincoln's sparrow and yellow-breasted chat) population trends	N/A numbers

There is no meaningful way that we can monitor population trends within the Kaibab National Forest. This would have to be done with Region wide sampling. Funding is doubtful, given our obligations the funding for listed species, such as the Mexican spotted owl, and declining budgets. It probably makes more sense to monitor riparian habitat conditions and make inferences concerning these indicator species. Habitat monitoring is our most effective and cost efficient method. Whether to change, drop or supplement this item will be considered in a future Plan amendment.

Wildlife 25	Aquatic Macro-Invertebrates - Species diversity and biomass	N/A BCI

There is only one live stream on the Kaibab, North Canyon Creek. It had a base line inventory for macro-invertebrates done on North Canyon Creek in 1990.

Sampling has not been done on the 2 year time frame prescribed. Monitoring should continue, but, a five- or ten- year time interval would be adequate based on the risk to change. This is because the entire stream is located within the Saddle Mountain Wilderness.

Wildlife 26-27	Threatened and Endangered Species - amount of suitable habitat and population trends	acres/numbers

The Kaibab only has the presence of three listed species, wintering bald eagle, Apache trout, and the Mexican spotted owl. The Mexican spotted owl has already been covered earlier. The issues need to be articulated and monitored. The peregrine falcon was delisted in 1999.

Habitat in North Canyon for the **Apache trout** is not anticipated to change but water quality measurements should be sampled (Item Wildlife 25).	N/A acres N/A numbers
There really is no threat to the **wintering bald eagle** from Plan activities. Many other factors, such as the availability of open water, and animal carcasses present affect where the eagles are. The anount of snow on the roads affects where the counters get to for the inventories. Figures for 1993 through 1997, respectively are 21, 17, 11, 13 & 16.	N/A acres 22 numbers

The largest current threats to the amount of suitable habitat for the Mexican Spotted Owl probably come from the risk of catastrophic wildfire and major outbreaks of bark beetles and budworms. With decades of fire suppression, the mixed conifer portion of the Forest has become more dense than any available evidence indicates it ever has been across landscapes. Areas previously

dominated by aspen and ponderosa pine have been succeeded by white fir and Douglas-fir in multiple canopy layers. While this may present a short-term benefit for the Mexican Spotted Owl, it has also created conditions which lead to forest-replacing fires, which were uncommon or even unprecedented in pre-Columbian times in the Southwest.

Bald eagles are monitored by the Forest once per year by visting popular sites and counting. The Forest has two spotted owl territories that have been part of the Regional monitoring effort. Both territories still exist with no indication of a decline in the Regional or Forest population.

Wildlife 28	Sensitive Species - amount of suitable habitat and population trends.	N/A acres

This item directs population monitoring. We have an estimated 50 sensitive species. As discussed in earlier items, population monitoring is very expensive and needs to be done at a larger scale. It would be impossible to monitor the populations of 50 species. The risk of spending a lot of money and not getting reliable populations trends is very high. An example is all of the money the Region spent on the spotted owl monitoring that could not be used by the Recovery Team. The exception to this is where a species only occurs locally.

We need to monitor for the rare and special components. We have two conservation strategies which will recommend monitoring. We need to review all of the sensitive species and articulate special habitat needs and concerns and based on these build monitoring item(s). In that regard, monitoring emphasis should be placed on habitat, not population.

Wildlife 29	Diversity - successional stages of major vegetative types	N/A acres

We have a radically different desired condition with the 6/96 Regional Plan Amendment than previously. An evaluation needs to be made of the progress from the existing condition to the desired condition. This is being done with each Ecological Management Area (EMA). Populations can be cyclic in numbers and density-independent variables like climate, could very well be a major factor that has not been considered.

VSS is a very poor measure of successional stage in uneven-aged Forests and in most Southwestern conditions in general, where most natural and human-caused disturbance has tended to be incremental rather than stochastic. A better measure is probably the amount of biomass by size class and life form and the general trajectory these are taking on the Forest. Actual change in these factors is likely to be quite slow; none of them may be a good Plan monitoring measure. This will be considered in a future Plan amendment.

Facilities 1	Forest Transportation System

In FY99 the Kaibab National Forest reconstructed 30.5 miles of road. Maintenance was performed on portions of the reported 7,499-mile system of roads. Only 7 miles of road were reported as fully maintained or 0.1% of the total system roads. This can be attributed to the definition of fully maintained which means the road is in a “like new” condition without any additional needs. What this means is that even though we may blade a road and/or perform some additional maintenance on the road, we do not report it as fully maintained if there are additional maintenance items. We also identified and decommissioned 56 miles of unneeded roads in 1999.

In 1999 a national effort began to perform road condition surveys and develop accurate cost estimates for annual and deferred maintenance needs. Maintenance level 3, 4 and 5 roads were surveyed in 1999 and maintenance needs were reported to the Washington Office. On the Kaibab National Forest it was estimated that $3,386,576 is needed to maintain the level 3, 4 and 5 roads on an annual basis (the road maintenance budget for all roads on the Kaibab in 1999 was $858,000). In addition, there is a $17,145,757 backlog in deferred maintenance needs for the level 3, 4 and 5 roads and $5,159,353 are needed for capital improvements on those roads. The deferred maintenance effort will continue over the next several years with a target of 25% of the level 1 and 2 roads being surveyed every year for the next 4 years.

The open to off road travel policy on the Kaibab N.F. continues to present challenges to the management of the Forest. Newly discovered "by use" roads continue to appear as recreation uses increase and OHV use in particular gains in popularity. This policy also makes it difficult to effectively decommission or close roads in areas where off road travel is occurring as well as making accurate transportation inventories and road density information an issue.